Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Webinar

Development of experimentation techniques in understanding the role of interfaces in molecular spintronics

Saurabh Chaudhary

TCIS, Hyderabad

Bringing the molecule in close vicinity to the metal surface causes the broadening in molecular energy levels or p-d hybridization leading to the formation of molecule/metal interface. Interface has electronic and magnetic properties which are different from the properties of respective molecule and metal. Thus, it becomes crucial to understand the interface and interface effects to find their device applications after tuning them accordingly.

In section-I, instrumentation facility which includes the world's first integration of cryogen-free STM and cryogen-free superconducting magnet with the vacuum cluster line assembly will be discussed. Commissioning of this unique and challenging experimental setup was achieved through rigorous effort in decoupling the STM system from unwanted resonant noise signals being transmitted via the connected growth chambers being continuously pumped through turbomolecular and roughing pumps. The performance analysis of STM was carried out by doing topographic imaging and spectroscopic measurements of several standard samples like highly oriented pyrolytic graphite and gold crystalline thin film. The deposition and in-situ calibration of thin films of molecules on metal surface was done.

In section-II, the observation of magnetic hardening at the interface of CoPc and Fe because of exchange bias effect in ex-situ magneto-transport measurements will be discussed. Which is observed even in zero field cooled samples unlike the conventional exchange-bias systems because of the strong p-d hybridization at the molecule/metal interface. Thus, this study will be helpful in further understanding the role of p-d hybridization at the interface in deciding the strength of magnetic exchange coupling.

Monday, Feb 1st 2021

2:30 PM